Title: Screening for and Monitoring of CFRD During Acute Pulmonary Exacerbation

Background: Diabetes in people with cystic fibrosis (PWCF) is often asymptomatic. When diabetes is undetected, it may lead to nutritional and pulmonary deterioration and therefore, regular screening is necessary. The screening for cystic fibrosis related diabetes (CFRD) should begin at the age of ten years with an annual 2-hour oral glucose tolerance test. Patients with CF may experience hyperglycemia during an acute illness or enteral feeding. During an acute pulmonary exacerbation (APE), glucose levels should be monitored for the first 48 hours using fasting and 2-hour postprandial plasma glucose levels. The diagnosis of CFRD can be made in PWCF during an acute illness when fasting plasma glucose levels ≥ 126 mg/dL or 2-hour postprandial plasma glucose levels ≥ 200 mg/dL persist for more than 48 hours. The diagnosis of CFRD can be made in PWCF on enteral feedings when mid- or post-feeding plasma glucose levels exceed 200 mg/dL on 2 separate days. If the diagnosis of CFRD is not confirmed, the testing should be discontinued after 48 hours, and resume the annual routine screening. For hospitalized patients with diabetes, glucose monitoring should be performed before meals. If not eating, then glucose monitoring should be done every 4 to 6 hours. The CF care team at Cardinal Glennon Children's Hospital (CGCH) developed an admission order-set with the screening recommendations, however monitoring is unclear for PWCF and diabetes or on enteral feedings.

Objective: To evaluate the screening for and monitoring of diabetes in patients with CF during an acute pulmonary exacerbation

Methods: All patients with CF cared for at CGCH with an acute pulmonary exacerbation in 2018 and 2019 were included and the electronic medical record was reviewed. Patient age, CF genetic mutations, BMI percentile, glucose levels, A1C level, CFRD diagnosis, insulin use, enteral feeding, and corticosteroid use were collected. Data will be analyzed for appropriate screening and monitoring based on criteria from the American Diabetes Association (ADA) and CF Foundation Clinical Care Guidelines for CFRD and the ADA Diabetes Care in the Hospital Standards.

Results: There were 171 encounters from 38 patients, the most recent encounter was selected for inclusion. Overall, 34 patients were included: seven (20.6%) with CFRD and 27(79.4%) without CFRD. The mean age for CFRD patients was 19.1 ± 2.8 years, and 14.7± 3.3 years for those patients without CFRD. Patients with CFRD were older. There were no differences between groups for BMI percentiles. Most of patients were homozygous for the genetic mutation. There were four (57.1%) CFRD and 13(48.1%) without CFRD patients on corticosteroid. In patient without CFRD within 24 hours; There were 9 (33.3%) patients lacking appropriate monitoring. In 48 hours, 11 (40.7%) patients were lacking appropriate monitoring and four (14.8%) patients were impaired and needed close follow up.
In patients with CFRD, two (28.6%) and one (14.3%) patients had impaired fasting glucose at admission and 24 hours. Five (71.4%) and 4(57.1%) patients had the fasting glucose diagnosis of diabetes at admission and 24 hours. Three (42.8%), two (28.6%) and three (42.8%) patients had post prandial diabetes diagnosis at lunch, dinner, and bedtime. Four (57.1%) patients had all the monitoring needed for CFRD patients.

Conclusion: Results suggest that the screening for diabetes in patients without CFRD was appropriate in more than half patients, however, there is still a progress to be made. Monitoring for patients with CFRD at Cardinal Glennon's children hospital was mostly appropriate according to the standard of clinical guidelines for cystic fibrosis-related diabetes